An Epochal Lamp Makes its Debut

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LIGHT

Dr. Luckiesh herewith discusses the most remarkable development in lighting since the gas-filled lamp

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A new era of light for health and vision now glows upon the horizon

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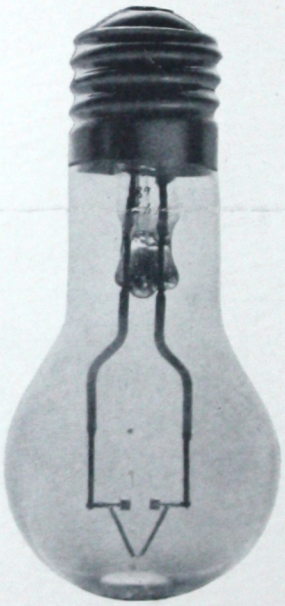
The debut of a new light-source is an important event even in this scientific age of ever-increasing momentum. The advent of a source of health-giving rays as well as of light for seeing is truly epochal. The New Type S-1 lamp which makes its first commercial appearance as the heart of the General Electric Sun-lamp is the beginning of a new epoch. Whatever the benefits possessed by nature's sunlight, they are now possible wherever electric service is available. Science has made one more great stride toward complete realization of its challenge to the Sun.

The introduction of a new light-source is a rare event, and a simple, practicable and reasonably efficient source is even rarer. Mazda lamps are popular because they are simple and efficient. They supply some ultra-violet radiation but it has long been known that the arcs—mercury, carbon, iron—must be depended upon for large quantities of ultra-violet radiation. But arcs are notably complex and this militates against their widespread use. The quartz mercury arc which is so widely accepted by the medical profession in bringing the benefits of vita-rays in the cure of human ills, emits light of a quality not generally acceptable. Its light is deficient in red rays and there are other gaps in its spectrum. There have been applications of mercury arc and incandescent lamps which combined provide a satisfactory quality of light.



In the new lamp Mr. R. F. Strickland has achieved a combination of the tungsten filament and the mercury arc in a very simple manner. The radiation from the arc is rich in ultra-violet radiation known to be beneficial in the preservation of health and in the cure of certain diseases. Starting with this it is possible to control the extent of the ultra-violet spectrum by means of a bulb having the desired spectral transmission characteristic.

The new source is at present designated as the Type S-1 lamp—the S being the symbol for sunlight. The relative amounts of light (as measured visually with a photometer) from the arc, electrodes, and filament are to some extent under the control of the lamp-designer and can be varied somewhat as experience dictates. At the present time the filament supplies approximately 7 per cent of the total light-output; the arc, about 25 per cent; and the electrodes, the remaining 68 per cent. The V-shaped tungsten filament hangs downward from the supports. When current is supplied to the filament, mercury from a pool beneath it is vaporized and almost instantly the current arcs across the space between the electrodes. At present the lamp is designed to operate throughout a wide range of angles of the lamp-axis with the vertical.

The Type S-1 lamp is essentially a low-voltage source and the volt-ampere characteristic of the transformer is very important. The no-load volts of the secondary are approximately 35. When the switch is closed the filament takes about 9 amperes and the drop across it is approximately 33 volts. Almost instantly the arc begins to operate without any further operation on the part of the user. Now the mercury arc between tungsten electrodes is operating in parallel with the tungsten-filament; the volts have dropped to about 11 and the total current passing through the filament and the arc is approximately 30 amperes. Obviously this new source operates only in equipment designed for it and for the present the portable equipment is intended only for alternating-current circuits of the standard voltages—110-125 volts.

In the development of this source it has been the aim to approximate the effects of midsummer midday sunlight. It is known that the health-giving rays of solar radiation are maximally effective between the wave-lengths of 3100A° and 2900A°. The solar spectrum does not extend beyond Å2900 and the energy decreases very rapidly from Å3000 to Å2900. Whatever the health-rays of sunlight are it is unnecessary for normal eyes to be protected by means of goggles. The fields of great promise for this new artificial source demand that the radiation emitted should be limited to the region of the spectrum which is not harmful to the eyes. This has been achieved approximately so that this radiant energy emitted by the Type S-1 lamp can be considered to be reasonably safe. However, we do not look at the sun and we exercise judgment and caution in exposing ourselves to midsummer midday sunlight. If we are to have the same radiation from an artificial source we must also exercise the same cautions.

In conserving and in controlling ultra-violet radiation it is necessary to know the spectral reflection and transmission characteristics of materials. Aluminum and chromium are satisfactory and oxidized aluminum is particularly efficient in its reflection of ultra-violet radiation of the wave lengths of primary interest. Vitrified

Make Health With This New Lamp When The Sun Hides

WHEN WINTER DAYS DEPRIVE US OF THE SUN

Grey skies and blizzard blasts of icy winds oblige us to be bundled up before we venture out-of-doors. Only a minimum of exposure to the bite of the storm and we are ready to dive back into the house. Our bodies are thereby deprived of the health-giving rays of the sun, unless, of course, we have one of the General Electric Sunlamps. This is an epochal development which supplies radiant energy for health as well as light for vision

CHILDREN NEED THE HEALTH RAYS OF THE SUNLAMP

Sunshine, or its equivalent, is of importance to growing children. When winter days bring them indoors now they need not be deprived of the essential ultra-violet rays. A G-E Sunlamp will aid in protecting them against certain ills which come concurrently with bad weather

porcelain enamel is unsatisfactory because the "glass" constituent absorbs the so-called vita-rays. Other so-called porcelain enamels vary considerably, owing to the spectral reflection characteristics of the "white" pigments. For example, zinc oxide absorbs practically all the ultra-violet radiation. On the other hand, some white pigments are quite efficient reflectors of vita-rays. Of course, the vehicle in which the pigments are suspended and eventually "fixed" is also important.

As to the effectiveness of the radiation from this new source it is sufficient for the present to compare it physically with solar radiation and with the radiation from the quartz mercury arc. It may be said to lie between them but practically it is close to midsummer sunlight. Inasmuch as both these sources have been accepted by the medical profession as being effective in the prevention and cure of diseases the conclusion pertaining to the radiation from the new source is obvious. However, diseases should be in the hands of medical men, but health can also be in the hands of the individual. It remains for the medical profession to appraise the Type S-1 lamp for its own use. From the viewpoint of the physics of its radiation it provides an artificial sunlight which can accomplish approximately what natural sunlight does.

The exposures which are necessary and safe depend upon the design of the reflector as well as upon the primary voltage for a given lamp. An average of many tests indicates that, as measured in foot-candles, the radiation from the Type S-1 lamp is of the order of magnitude of twenty times more effective in producing erythema (reddening of the skin) than midday midsummer sunlight with a moderately clear atmosphere. The susceptibility of the skin of an individual varies widely over the various portions of the body. Furthermore, the susceptibility of the skin of individuals varies widely. Everyone knows that a small percentage of skins are very sensitive to solar radiation. However, for most persons the sensitiveness of various portions of their skin and also of the individuals varies approximately from one to three in relative terms. A fairly permanent tan results from successive reddenings of the skin exposed to sunlight or to the artificial sunlight of the Type S-1 lamp. A good tan is a protection against reasonably excessive exposures to ultra-violet radiation from these two sources without eliminating the effectiveness of the health-rays.

Much scientific research is needed in this entire field of radiation as a health influence. However, sufficient knowledge is available to heartily welcome a source which produces an approximate artificial sunlight of the same effectiveness and safety—and necessity for cautious use—as midsummer midday sunlight. Extensive researches have already been made with Type S-1 lamps and others are in progress. In a future article these will be discussed, but the glimpses already presented reveal a new epochal source and indicate that a new era of lighting for health as well as vision is about to begin.

The General Electric Sunlamp is the forerunner of a new kind of lighting equipment designed to control ultra-violet energy as well as light. Arc lamps are now used for health-giving rays but in this new field of lighting for health and vision, simplicity will win as it did in the narrower field of lighting. Eventually we shall see fixtures on ceilings and walls dispensing the benefits of artificial sunlight while we work or play.

NELA PARK IN GALA CHRISTMAS DRESS